

## The Structure of the CCV Syllable of Akan\*

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The issue that is looked into in this paper is whether or not the CCV syllable structure in Akan involves a true consonant cluster. Following Dolphyne (1988), an attempt is made to discuss the issue with the claim that Akan does not have a basic CCV structure, but only a surface realization of it. It is explained that the surface CCV is motivated by the economy of expression principle (e.g. Bresnan 2001). It is argued therefore that where CCV seems to have been realized, it is only so because of an application of an economy-motivated process of vowel elision that results in a syllable reduction. It is accordingly explained that the ensuing CCV should be analyzed into CVCV. Three factors, i.e. occurrence of [r], attainment of vowel harmony and the specification of the feature high, are discussed as contributors to the realization of CCV.

Key words: Akan, economy (of speech), labialization, syllable structure, vowel harmony, vowel height

### 1. Introduction

Consonant cluster(s) in Akan, specifically in Asante-Twi,<sup>1</sup> is the subject of discussion in this paper. In the discussion, the issue we look into and strive to explain is whether or not Akan has a true consonant cluster in a syllable. We endeavor to explain the claim that Akan does have a consonant cluster in the syllable, but only in the phonetic form as the most economical form. In other words, among the basic syllable structures of the language, there is no consonant cluster, neither in the onset nor in the coda. The non-existence of a basic consonant clusters in Akan is also illustratively pointed out by Dolphyne (1988:52-54). Akan has a number of basic syllable structures. The common ones are V and CV, as in *abaa* ‘a stick/cane’, which is syllabified as [V.CV.V]. As could be observed from [V.CV.V], the common ones are put together to form other basic structures, e.g. CVCV.

The fact that Akan does not have consonant clusters is immediately supported by the coda situation in the language. That is to say, the language has no closed syllables,

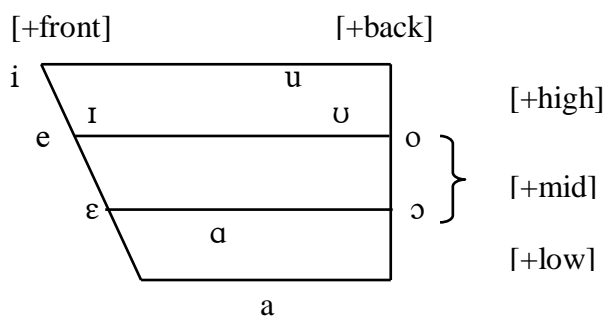
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<sup>1</sup> Akan is a member of the Kwa branch of the Niger-Congo language family and a two-tone language (i.e. high and low, e.g. see (2)) that is mainly spoken in Ghana. Asante-Twi is one of the major languages that comprise Akan. The other major ones are Fante and Akuapim-Twi. I focus on Asante-Twi in this paper although the name Akan will be used consistently as reference.

let alone, one that exhibits cluster. As Dolphyne (1988:53) explains, a final consonant constitutes a separate syllable in Akan. As noted by Kaye (1985), quoting Welmers (1973) and Pilote (1982), however, the onset situation in Akan seems to defy our claim that there is no consonant cluster (see examples in the data in (2)). However, in appropriate sections, we contend that where a consonant cluster seems to occur, it is only so because of an application of a phonological process that results in a syllable reduction and a subsequent re-syllabification of basic syllables. Accordingly, as will become evident, we explain that the ensuing CCV structure should be analyzed into two separate CV syllables. Before we delve into CCV, however, we must observe the vowel inventory of Akan on the chart in (1) below showing the necessary distinctive features, which will become necessary in our analysis.

(1) Akan vowel inventory and the necessary distinctive features



The rest of the paper is organized as follows. In the following Section 2, we look into the CCV syllable structure of Akan with regards to its constitution. We proceed in Section 3 to discuss how two factors (specifically, vowel harmony and the feature high) contribute to the accounting of the realization of the CCV structure. Under Section 4, we discuss other data of labial description to highlight the fact that CCV is only a realization from basic structures and that it is realized on attainment of the triggering factors discussed in Section 3. Section 5 concludes the paper with the affirmation of our claim that the CCV syllable is only a phonetic representation and, as such, it should be analyzed into separate basic syllables.

## 2. The CCV syllable structure

The CCV syllable structure is only represented in the form of CrV<sup>2</sup> in Akan, as could be seen in the data below.

<sup>2</sup> Indeed, CrV could still be discussed as two syllables based on tone bearing unit (TBU) analysis. That is, if tone is assigned to every individual syllable then Cr is a separate syllable from V. See Section 2.1 for some details on Cr as a separate syllable.

(2)	<u>CrV</u>	
	frà	‘to mix’
	bɹ <sup>1</sup> é	‘palm leaf’
	bɹò	‘beatings’
	gráá	‘a kind of container’
	èsr <sup>1</sup> é	‘type of weed’
	òbrá	‘life’
	ñkrùmá	‘okro’

The frequency of occurrence of the CrV structure in Akan immediately presupposes that it is one of the basic syllable structures in the language. However, one is curious to know whether CrV is really one of the basic syllable structures in the language or not since it is the only consonant cluster (hence, complex syllable structure) in the language. Thus, there is the need for it to be keenly observed, explained, and reanalyzed, if necessary.

Following the position of this paper that there is no basic complex syllable structure in Akan, we explain that CrV (as exemplified in the data in (2)) is only realized from two basic CV syllables. That is, the seemingly complex CrV structure in the language is only a phonetic form of a basic two-syllable string of CVrV that has been re-syllabified or restructured following a reduction in one. Specifically, in the realization of CrV, there occurs an elision of the vowel in the preceding CV structure. This reduced syllable then constitutes CrV with the succeeding rV structure. The ensued CrV structure is then re-syllabified into [Cr.V]. This is explained further in the latter part of Section 2.1. As Engstrand and Krull (2001) suggest, syllable reduction (as in the present case of Akan) is a characteristic of normal or casual speech. Thus, we explain that the CrV structure in Akan is only an economy-motivated phonetic form derived from a basic CVrV string. As illustrated in (2), one cannot however deny the fact that this form has now become part of the phonology of the language.

We urge notice of the fact that a vowel in a preceding CV syllable is not elided to yield the surface structure of CrV in all instances or at speaker’s will. As could be observed in (2), it is only elided when the consonant in the succeeding CV is the labio-dental approximant, [r]. Also, as will be explained in Section 3, the vowel (in the preceding CV) is only elided where it meets a particular phonetic feature specification(s). It is important to note that this case of syllable reduction and the subsequent re-syllabification (that results in the complex onset) is not unique to the Akan language. In Anyi, a language spoken in Cote d’Ivoire and closely related to Akan, Kaye (1985) observes that [l], [y] and [w], which occur in the same environment as [r] (as in Akan), also provoke emergence of CCV.

In a bid to ascertain that the CrV structure in Akan ensues from a basic CVrV structure, there is a need to explore more data and to give some pieces of evidence. In our exploration of other data in Akan and data from a related language called Nzema, which is also spoken in Ghana, we identify and discuss two pieces of evidence in this paper. These are noted as phonetic representation of CVrV in Akan and realization of CVrV in Nzema and they are explained in the following Sections 2.1 and 2.2 respectively. It is believed that Nzema used to be one of the dialects of Akan before it developed into a distinct language. Indeed, some researchers still class Nzema as one of the languages that constitute Akan (e.g. Burmeister (1976)).

### 2.1 Phonetic representation of CVrV in other data of Akan

In the data in (2), some of which are repeated in (3) for ease of reference, we realized that the CrV syllable structure is represented in the phonology. This is despite the position that CrV is only a phonetic realization from the basic CVrV string.<sup>3</sup>

(3)

<u>CrV</u>	
frà	‘to mix’
br <sup>l</sup> é	‘palm leaf’
gráá	‘a kind of container’
ñkrùmá	‘okro’

Besides the case in the data in (3), there are other words in Akan with the basic CVrV structure. However, unlike what we realize with those in (3), with them, this basic CVrV structure is maintained in the phonology as well. In other words, as could be observed in (4a) below, the vowel in the preceding syllable is not elided in the orthography. We observed however from data collected that the basic CVrV structure is realized as CrV in the phonetic representation (i.e. in speech) after all, as illustrated in (4b). As also shown in (4c), data collected suggest that the realization of [CV.rV] in normal speech is not optimal in terms of native-speaker intuition. Accordingly, we contend that the surface structure of CrV is generally obtained from the CVrV string of basic syllables.

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<sup>3</sup> As noted earlier, the realization of CrV forms the bases of the possible assumption that CrV is a basic syllable structure in the Akan language and that is the position we contest in this paper.

(4) a.	→	b.	c.	
CVCV		[Cr.V]	*[CV.rV]	
kuro	[ku.ro]	[kɾ.o]	*[ku.ro]	‘town’
kyere	[tɕi.re]	[tɕɾ.ɛ]	*[tɕi.re]	‘to teach’
pirebuo	[pi.re.bu.o]	[pɾ.e.bu.o]	*[pi.re.bu.o]	‘nest’
berɛ	[bi.re]	[bɾ.ɛ]	*[bi.re]	‘time’
nsoroma	[n.su.ru.ma]	[n.sɾ.u.ma]	*[n.su.ru.ma]	‘star’
agoro	[a.gu.ro]	[a.gɾ.o]	*[a.gu.ro]	‘game/play’

Indeed, the realization of the CrV structure in (4) evidently suggests that it is preferred to the basic CVrV syllable structure, even where CVrV is what obtains in the phonology. This preference is particularly based on economy of expression (e.g. Bencivenga 1987, Bresnan 2001, and Marfo 2005). Native speaker intuition therefore demands the use of the most economical form of the word. Based on this fact, we claim that CrV is more of a phonetic realization of a basic structure than a basic structure by itself. However, it obtains in the phonology of the language because of economy-induced phonological change, an occurrence that is not uncommon in active languages. So, the phonetic realization of CVrV undermines economy of speech. This goes a long way to strengthen our position that CrV is only a phonetic representation of CVCV.

As an alternative to the present analysis of elision that explains the realization of CrV, one could suggest an epenthesis account. However, in the present analysis, following our position that the economy of speech principle motivates the realization of CrV, an epenthesis account will crash. That is, epenthesis is triggered by constraints on maximal syllable (Rose 2000). While epenthesis demands an insertion of an item, among other things, economy demands otherwise. As (4) illustrates, native-speaker intuition favors the economy-backed elision analysis that explains the realization of CrV (from CVrV) rather than an epenthesis account that would have called for an insertion of an item. Specifically, an epenthesis account would have meant realizing CVrV (from CrV) through the insertion of a vowel and, as (4c) explains, this is not favored by native-speaker intuition.

As shown in (4), it is important to note here that, in the syllabification of CrV, Cr and V constitute separate syllables – i.e. [Cɾ.V]. This is explained in terms of tone assignment. As in many other tone languages, in Akan, tone is assigned to syllables and the peak of the syllable is the bearing unit. Thus, the fact that [r] is assigned a tone explains that it constitutes a separate syllable with the preceding consonant. It is assumed that [r] became the bearer of the tone because of the elision of a vowel (i.e. the nucleus) that should have come before it in a preceding syllable (Dolphyne 1988).

In this wise, the nucleus status of the elided vowel is assumed by [r] based on the sonority hierarchy (e.g. Katamba 1989).<sup>4</sup>

## 2.2 Realization of CVrV in Nzema

The other piece of evidence that explains the fact that the CrV structure in Akan results from the basic CVrV structure is one that pertains in Nzema. As noted earlier, Nzema is a language that is in one way or the other related to Akan. Thus, one could envisage that it could share some aspects of language in common with Akan.

Obviously, among other aspects of relation between Akan and Nzema, the one that is relevant to our analysis of the subject matter is the CVrV structure. There are some word counterparts in Akan and Nzema that are same in terms of basic syllable structure and in terms of meaning. However, they are set apart in the realization of the phonetic form. In other words, these word counterparts share common phonological and semantic structures, but they are phonetically realized differently in the individual languages. As could be observed in the data in (5), while a vowel before a liquid (i.e. [l] and [r]) is phonetically realized (or pronounced) in Nzema, it is elided in Akan.

(5) Nzema		Akan		
	<u>CVrV</u> → [CV.rV]		<u>CVrV</u> → [Cr.V]	
ten <u>labe</u> le	[tenlabe.le]	tènábéré	[ti.na.bɾ.ɛ]	‘abode’
zolo	[zo.lo]	sóró	[sɾ.ɔ]	‘on top/above’
sele	[se.le]	sèrè	[sɾ.ɛ]	‘to beg’
fili	[fi.li]	fírĩ	[fɾ.i]	‘to credit’
<u>buluwu</u>	[bu.luwu]	<u>bùrúù</u>	[bɾ.u.u]	‘blue’

The data in (5) establish that, indeed, the Akan word counterparts have a basic CVrV structure, just like their counterparts in Nzema, and they should be phonologically analyzed as such. That is not to say however that the phonetic form of CrV is wrong. Rather, as suggested earlier, the principle of economy of expression demands its realization and optimizes it. One could therefore assume that, while in the CVrV structure economy of expression applies in the case of Akan, it fails to do so in that of Nzema.

We noted Kaye’s (1985) observation that [l], [y] and [w] occurring in the same environment as [r] (as in Akan) also provoke emergence of CCV in Anyi in Section 2. One would want to know if [l], [y] and [w] provoke CCV in Akan as well. Starting

<sup>4</sup> Sonority hierarchy explains the level of audibility and propensity for spontaneous voicing (i.e. sonority) of a sound in relation to that of other sounds with the same length. See Katamba (1989) for example for details.

with [l], we note that it is not a “traditional” speech sound in Akan. Thus, even in some borrowed words (from English), [l] is often substituted for /r/, e.g. “plate” becomes “prɛte”. With the strong influence of English on Akan however, [l] and [r] have become free variants in Akan; they are often used interchangeably. For instance, in the Akan examples in (5) above, [sɾɔ] and [bɾuu] could be said as [sɫɔ] and [bɫuu] respectively. With [y], we could not find any CVCV word that has it as the initial consonant of the succeeding syllable. Last, but not the least, [w] does occur as the initial consonant of the succeeding syllable in a few CVCV words, as shown in (6) below. However, the vowel before it is never elided for the realization of CCV, as the counter examples indicate. This goes to affirm the fact that the initial consonant of the succeeding syllable has to be [r] and only [r] for the realization of CCV.

(6)	Word	[CV.CV]	*[CCV]	
	a. yiwan	[yi.wa.n]	*[ywa.n]	‘razor’
	b. ayowa	[a.yɔ.wa]	*[a.ywa]	‘earthenware bowl’
	c. nnwowa	[n.ɲwɔ.wa]	*[n.ɲwwa]	‘bees’

### 3. Other facts at play in the realization of CrV

There is no doubt that the occurrence of the sonorant, [r], as the onset of a succeeding syllable is a major factor for the realization of the CrV structure. As could be witnessed in (7) below (and in (6) above), where any other consonant is the onset of a succeeding syllable, CVCV is rather maintained.

(7)	[CV.rV] → [Cr.V]		[CV.CV] → *[CC.V]			
	[ku.ro]	[kɾ.o]	‘town’	[n.ku.to]	*[n.kt.o]	‘sheabutter’
	[du.ro]	[dɾ.o]	‘bunch’	[du.do]	*[dd.o]	‘concoction’
	[pɪ.ra]	[pɾ.a]	‘to sweep’	[pɪ.pa]	*[pp.a]	‘to clean’
	[pɔ.ro]	[pɾ.ɔ]	‘to rot’	[pɔ.tɔ]	*[pt.ɔ]	‘to blend’
	[hɔ.ru]	[hɾ.ɔ]	‘to wash’	[hɔ.nɔ]	*[hn.ɔ]	‘to swell’

Although the occurrence of [r] and its role in the realization of CrV cannot be undermined, we explain that two other phonetic facts relating to vowels also come into play in the realization of the surface form of CrV. These are the principle of vowel harmony and vowel height discussed in Sections 3.1 and 3.2 respectively. It will become evident that vowel harmony should be attained between the vowels in the syllables concerned (see (8)) and the vowel in the syllable preceding the one that

contains [r] – i.e. the vowel to be elided – must specify for the feature high (i.e. [+H]) with regards to tongue height (see (9)).

### 3.1 The property of vowel harmony

As noted in (1), Akan has ten phonetic vowels and it is assumed that they fall into two phonetically distinct sets based on the advancement of the tongue root (i.e. ATR) in articulation, i.e. the positions of the tongue root during the production of each of the vowels (Berry 1957, Clements 1981, Steward 1982, van der Hulst and van de Weijer 1995, Bodomo and Marfo 2006, etc.). Thus, a vowel is either produced with an advanced tongue root or with a retracted tongue root. Those produced with advanced tongue root are [i, e, o, u, a] and they are noted as [+ATR] in terms of feature specification. Also, those vowels that are produced with a retracted tongue root are [ɪ, ɛ, ɔ, ʊ, ɔ] and they are noted as [-ATR]. Following this distinction, the vowel harmony principle requires that all vowels occurring in a stem or a (prosodic) word must share a common ATR specification. It is important to note however that there are a few words in the language within which the principle is violated (see (9)).

On a keen observation, we explain that CrV is realized when the vowel harmony principle is satisfied between the syllables concerned – i.e. CV and rV. In the data in (8) below, a repetition of (4) with ATR feature description (on the vowels), therefore, we observe that the achievement of vowel harmony contributes to the realization of CrV ([Cr.V]).

(8)	$\frac{[CV_{[\infty ATR]}, CV_{[\infty ATR]}]}{[k\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.r\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}]}$	$\rightarrow$	$\frac{[Cr.V]}{[k\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.o]}$	‘town’
	$[t\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.r\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}]$		$[t\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.e]$	‘to teach or show’
	$[p\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.r\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.bu.o]$		$[p\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.e.b\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.o]$	‘nest’
	$[b\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.r\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}]$		$[b\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.e]$	‘time’
	$[n.s\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.r\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.ma]$		$[n.s\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.u.m\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}a]$	‘star’
	$[a.g\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.r\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}]$		$[a.g\underline{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\cdot}}}{\cdot}}.o]$	‘game or play’

The claim that ATR harmony satisfaction is involved in the realization of the CrV structure in Akan is established on the case of a violation of the ATR harmony. We argue that there are some other words in the language which have the sonorant, [r], in a succeeding syllable alright, but the CVrV structure is maintained. As the data in (9) illuminate, in these words, there is an apparent ATR disharmony between the vowels in the syllables concerned. In other words, the vowels are from both sets of the ATR



divide and ATR harmony is accordingly violated. The argument therefore is that, without a common ATR specification, the CrV syllable structure cannot be realized.

(9)	Word	[CV <sub>[∞ATR]</sub> ·CV <sub>[∞ATR]</sub> ]	
a.	pira	[p <sub>ɪ</sub> .r <sub>ɑ</sub> ]	‘to get hurt’
b.	fira	[f <sub>ɪ</sub> .r <sub>ɑ</sub> ]	‘to wear or cover’
c.	akurase	[a.k <sub>ɪ</sub> .r <sub>ɑ</sub> .sɪ]	‘village’
d.	abura	[a.b <sub>ɪ</sub> .r <sub>ɑ</sub> ]	‘well’
e.	hura	[h <sub>ɪ</sub> .r <sub>ɑ</sub> ]	‘to ferment’

As could be seen in (9), the disharmony in each case involves the [–ATR] central vowel [a]. Generally, however, it is argued in the literature (e.g. Clement 1985 and Kager 1997) that the central vowels underlyingly specify for a particular ATR feature. Because of that, they block the spread of contrastive ATR specification from their left. Those vowels occurring after them, however, share their individual underlyingly specified ATR feature, as could be seen in (c) of (9) and the data in (10). Thus, the central vowels are often described as opaque (to the spread of a contrastive ATR feature). We note however that the data in (10) is not particularly related to our CVrV (to CrV) structure under discussion.

(10)	òbédwàré	[ɔ̀bɛ̀dzɔ̀arɪ]	‘s/he will bath’
	òtwàì	[ɔ̀tɛ̀ɔ̀arɪ]	‘s/he cut’
	àñm̀gùàsèé	[ɑ̀nim̀gɔ̀asɪɛ]	‘disgrace’
	àsómàdú	[ɑ̀sɔ̀mɑ̀dɔ̀]	‘personal name’

The consideration of the status of the low vowels here, particularly the unadvanced one [a] that has been frequent in our present analysis, is necessary. This is because it answers a potential question, i.e. why is it that the occurrence of [a] generates a seemingly disharmony among vowels occurring within the supposed harmonic domain of a prosodic word or phrase? As noted by Clements (1981), Kager (1997), etc., the occurrence of [a] in a word does not cause disharmony per se. As could be observed in (10), it rather establishes a “two-span” harmony in these words.

### 3.2 The property of vowel height

There is another case of words in Akan within which we have the CVrV and the satisfaction of the ATR harmony, but the vowel in the succeeding syllable (i.e. before [r]) is maintained. The data in (11) illustrate some of these words and, in them,

observe that the preceding CV structure fails to undergo reduction for the realization of CrV.

(11)	sɔre	[sɔ.rɪ]	‘to stand or to worship’
	mmɔre	[m.mɔ.rɪ]	‘fermented milled maize’
	sohori	[so.ho.rɪ]	‘limpkin’ (a kind of long legged bird)
	pori	[po.rɪ]	‘to hit one’s foot on a stone’
	yareɛ	[ya.rɪ.ɛ]	‘sicknesses’
	gare	[ga.rɪ]	‘cereal made from cassava’
	fereɛ	[fɛ.rɪ.ɛ]	‘shyness/embarrassment’

The situation in (11) presupposes that, aside from the factors of [r] occurrence in the succeeding syllable and the satisfaction of the ATR harmony, another one has a bearing on the analysis. We explain that the maintenance of CVrV in (11) is due to the non-attainment of another phonetic factor and this is noted as the feature specification of vowel height.

Recalling from (1) in Section 1, let us note that Akan like many other languages has four high vowels – i.e. [i, ɪ, u, ʊ]. Now, looking at the data in (10), we witness that none of the vowels in the syllable preceding the one containing [r], which is supposed to elide, has the feature specification of high – i.e. [+H]. This is unlike what pertains in the data in (2)-(5) and (7)-(8), where none of the vowels is without the feature [+H]. Indeed, the highness of these vowels is confirmed by the height-based scale of sonority (e.g. see Howe and Pulleyblank 2004 and Kent and Read 2002), which is proven by both acoustic and aerodynamic evidence as cross-linguistically motivated (Parker 2002). We have noted the requirement that a vowel occurring in the syllable before [r] must be in harmony with the one in the succeeding rV syllable before it can be elided for the realization of CrV. Presently, with the involvement of the feature high, we further suggest that this same vowel must also specify for the feature [+H] as relevant data above illustrate. Otherwise, as could be witnessed in (12) below, a [–H] feature description of (11), the vowel stays put for the maintenance of the CVrV structure at the surface level. Thus, in (12), also observe from the counter examples that where this vowel is elided, ill-forms of the words are realized.

(12)	<u>[CV<sub>[-H]</sub>. rV]</u>	→	<u>[CV.rV]</u>	<u>[Cr.V]</u>	
	[sɔ <sub>[-H]</sub> .rɪ]		[sɔ.rɪ]	*[sɾ.i]	‘to stand or to worship’
	[m.mɔ <sub>[-H]</sub> .rɪ]		[m.mɔ.rɪ]	*[m.mɾ.i]	‘fermented milled maize’
	[soho <sub>[-H]</sub> .rɪ]		[so.ho.rɪ]	*[so.hɾ.i]	‘limpkin’ (a kind of long legged bird)
	[pɔ <sub>[-H]</sub> .rɪ]		[pɔ.rɪ]	*[pɾ.i]	‘to hit one’s foot on a stone’
	[ya <sub>[-H]</sub> .rɪ.ɛ]		[ya.rɪ.ɛ]	*[yɾ.i.ɛ]	‘sicknesses’
	[ga <sub>[-H]</sub> .rɪ]		[ga.rɪ]	*[gɾ.i]	‘cereal made from cassava’
	[fɛ <sub>[-H]</sub> .rɪ.ɛ]		[fɛ.rɪ.ɛ]	*[fɾ.i.ɛ]	‘shyness/embarrassment’

As has been shown in the data in (13) below for comparison with the data in (12), therefore, the [+H] feature of vowels is in no small way another strong phonetic requirement without which CrV cannot be realized. In other words, the reduction of CVrV into CrV is obtained where the vowel in the preceding syllable (i.e. CV) specifies for [+H].

(13)	<u>[CV<sub>[+H]</sub>. rV]</u>	→	<u>[Cr.V]</u>	
	[ku <sub>[+H]</sub> .rɔ]		[kɿ.ó]	‘town’
	[pi <sub>[+H]</sub> .re.bu.o]		[pɿ.è.bú.ó]	‘nest’
	[bɪ <sub>[+H]</sub> .rɛ]		[bɿ.é]	‘time’
	[n.su <sub>[+H]</sub> .ru.ma]		[n̩.sɿ.ú.má]	‘star’
	[a.gu <sub>[+H]</sub> .rɔ]		[à.gɿ.ó]	‘game or play’

#### 4. Labialized case

In the analysis of the CrV structure of Akan, we have noted the basic structure of CVrV and the two phonetic factors of vowel/ATR harmony and vowel height, without which CrV cannot be realized. In this section, we bring in and discuss other data in Akan that seem to undermine our arguments so far.<sup>5</sup> It will become evident however that these other data indeed support our argument. Examples of the data in question are in (14) below.

<sup>5</sup> Data here are hardly available. Thus, one could easily overlook them. However, their analysis with respect to the structures under discussion in this paper will enable a better understanding of the realization of CrV.

(14)	<u>CVrV</u>	→	<u>[CV.rV]</u>	
a.	kòrá		[kʊ.ra]	‘calabash’
b.	kó'ró		[kʊ.rɔ]	‘a skin disease’
c.	dòrá		[dʊ.ra]	‘fishing hook’
d.	àñkórɛ		[a.n.kʊ.rɛ]	‘barrel’
e.	hùrĩ		[hu.ri]	‘jump’

Based on the actual/phonetic representation of data collected, we contend that CrV is actually realized in the data in (14). Indeed the realization of CrV is not immediately clear in the data in (14). However this is only because, before the vowel preceding the [r]-initial syllable is elided, it causes a secondary articulation of labialization to the consonant with which it constitutes a syllable (see the data in (16), a re-analysis of (14)). In other words, labialization applies immediately before vowel elision; hence, the seemingly incomplete elision of the vowel. The labialization rule in Akan, as schematized in (15) below, states that a consonant (C) is labialized (Lab) before a rounded vowel ([+R]). The [+R] vowels are [u, ʊ, o, ɔ], all of which are also back vowels in Akan (see (1)).

(15)	[C]	→	[Lab]	/	<u>        </u>	V
						[+R]

Considering the fact that the vowels we are interested in (i.e. the vowel preceding the [r]-initial syllable) should also specify for [+H], [u] and [ʊ] are particularly relevant in our analysis. Accordingly, as could be seen in (15), with their individual occurrences, we explain that CrV has actually been realized and that the vowels are only somehow perceptible in the phonetic form because they have induced labialized forms of the consonants they succeed and, so, their feature trait of [+H] is left in the labialized consonant. This trait in the labialized consonant gives room for the assumption that the vowels are maintained and, for that matter, CrV is not realized. However, as has been explained and could be seen in (16), we claim that this is not the true case.

(16)	<u>CVrV</u>	<u>[CV<sub>[+H]</sub>.rV]</u>	→	<u>[C<sup>w</sup>ɾ.V]</u>	
a.	kòrá	[kʊ.ra]		[k <sup>w</sup> ɾ.a]	‘calabash’
b.	kó'ró	[kʊ.rɔ]		[k <sup>w</sup> ɾ.ɔ]	‘a skin disease’
c.	dòrá	[dʊ.ra]		[d <sup>w</sup> ɾ.a]	‘fishing hook’
d.	áñkòrɛ	[a.n.kʊ.rɛ]		[ank <sup>w</sup> ɾ.ɛ]	‘barrel’
e.	hùrĩ	[hu.ri]		[h <sup>w</sup> ɾ.i]	‘to jump’

In (16), we observe in (a) “*kora*” for instance that the vowel [ɔ] is elided with the attainment of the ATR harmony (between it and the vowel in the following syllable) and its specification for the feature [+H], as explained earlier). But, we also realize that the initial consonant /k/ is labialized as [k<sup>w</sup>] via the vowel [ɔ] that is ultimately elided. Hence, we get the phonetic form, [k<sup>w</sup>ɾa]. As we observed in Section 3.1 and illustrated in the data in (9), if there had been a disharmony as in the word *kura* [kɾa] meaning ‘to hold’ for instance, the vowel preceding the [r]-initial syllable could not have been elided, although we will still have the labialization taking place (i.e., [k<sup>w</sup>ɾa]).

## 5. Conclusion

We have argued in this paper for the position that Akan does not have a basic CrV syllable structure. We have explained that CrV is only a phonetic representation, which is attained from a basic string of CVCV. We have also looked into the structure of CVCV and it has been established that the consonant in the succeeding syllable must be the sonorant [r] in order for CrV to be realized.

Further, in our bid to explain how CrV is realized from CVrV, we have also looked into other details besides the fact that [r] should be the initial segment in a succeeding syllable. In this direction, vowel harmony with regards to the advancement of the tongue root (ATR) in Akan and the feature specification of [+H] have been identified and discussed as other triggering factors, without which CrV is not realized. We have explained that, for CrV to be realized, ATR harmony should be attained between the vowels in the syllables concerned and, also, the vowel in the preceding syllable that is to elide should have the [+H] feature specification.

With other CVrV data of labial orientation, we have explained that CrV could still be realized once ATR harmony and [+H] specification are attained. In a nutshell, we have arguably explained that CrV is indeed not a basic syllable structure in Akan and that, even where it is phonologically represented in the language, it should be analyzed as CVrV. The phonological representation of CrV has been explained as due to phonological change, which is particularly motivated on the principle of economy of speech.

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## 阿干語中的 CCV 音節結構

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本論文旨在探討阿干語的音節是否容許一個以上的子音同時出現。根據我們對於 CCV 音節的研究顯示，CCV 只是表層的顯現，並不存在於底層結構中。表層的 CCV 是因表達經濟原則引發的母音刪略，而使音節縮減所致的；也就是說，其底層結構為 CVCV。[r]的出現、元音和諧的結果及[高]的特徵是造成 CCV 的三個要素。

關鍵詞：阿干語、（言語）經濟、唇化、音節結構、元音和諧、母音高度